

*Note.*—To the description of *H. asper* (= *G. spinicaudus*) I will add that the number of ribs in this species is thirteen pairs, not fourteen, and that the first two pairs of ribs are united to the large excavated manubrium sterni. This is followed by a smaller piece, to which two pairs of ribs are also attached, and which is united with the manubrium by a synchondrosis. Then follow two small sternal vertebræ, to which three pairs of ribs are attached; and then comes the processus xiphoideus. Thus there are seven pairs of true, and six pairs of false ribs.

XL.—*Additional Remarks on the Homologies of the Flowers of Conifers.* By ANDREW MURRAY, F.L.S.

ON looking over my paper on the above subject in last month's 'Annals,' I see that I have scarcely sufficiently unbosomed myself on one point, which, on reperusal, seems to me to deserve more remark than I gave it.

The point is, whether the bract is the equivalent of the petal or of the calyx. That it is part of the floral envelope I have no doubt; and all that I said regarding it in that capacity (which was the most important point of view in my inquiry) would apply equally to it as either.

The main purpose to which I put it was to prove that the scale was equivalent to the disk, as lying between the pericarp and the petal or floral envelope; and on that point I do not think more need be said. But the question remains,—What particular part of the floral envelope is represented by the bract?

In my last paper I pointed out that the appearance of the scale of the female flower of *Wellingtonia gigantea* might lead to the belief that it was the equivalent of the male scale, and consequently must be the female petal; and I warned the reader against adopting that view, because I considered that the more petaloid character of the bract (a claret-coloured crust in *Wellingtonia*) rendered it improbable that it should be the calyx, and the green scale the petal. Having arrived at this conclusion, I omitted to give, or, rather, I deleted from my paper, an explanation which had occurred to me of the mode in which the scale combined the functions of disk and petal.

On reconsideration, that explanation appears still to have so much to recommend it that I now briefly submit it to the reader as an alternative view of the homology of the bract.

We have seen that the petal of the male flower is merely a continuation of the leaf-scales growing on the twig which bears the flower. That the scale of the female flower seems to be in

exactly the same relation to the leaf-scales on its twig is a strong argument in favour of that scale being a petal too.

If it really be so, then, of course, the bract must be the calyx. Its texture (wholly or partially petaloid) is suggestive of no character so much as that of part of the floral envelope.

There is nothing inconsistent with this being the case in the bract appearing before the scale: the calyx always precedes the corolla in development. But it would be inconsistent with the process of development were the scale, if it be a petal, to continue increasing in size *pari passu* with the seed, as it in fact appears to do; but the explanation of this growth may be, that it is the disk which grows at the base of the petal. I pointed out that the growth of the scale was not equal all over, but took place chiefly towards the base; the apophysis, in short, may be the outer coat of the petal resting like a mantle on the top of the disk which has grown up under it, in the same way that the hip of a rose increases in size, bearing up upon its crown the decayed rose-petals, only that in the Conifers the substance has penetrated between the outer and inner walls of the petal, and filled out the space between them. And if we refer back to the structure of the scale, as shown in Plate X., we shall see that there is nothing in it inconsistent with this notion. The scale is composed of two layers, as it were, with an indication of an intermediate line running backwards between them from the prickle in the midst of the apophysis—in other words, from the supposed point of the petal. And if we examine a rose-hip, we find it is composed of two layers also, with an intermediate one wedged in near the apex, on which the petals and stamens grew. In the Conifers the inner layer has a double woody core, like a set of branches separated into blades. The rose-hip has a similar set of ligneous fibres branching through its inner layer or disk; and what is noteworthy is, that these too are disposed in double layers or blades.

The scale and bract of *Cunninghamia Sinensis* and *Sciadopitys verticillata* come nearer to the hip of the rose than those of any other Conifer which at present occurs to me. In these the bract is united to the scale; so that we have the calyx, petal, and disk all united, as in the rose, the petal being represented by a woolly fringe on the crown of the scale.

Thus, as we have in some Conifers the bract united to the scale, and in others not, it is plain that the union of these different parts is not essential to the relations of a disk, as indeed we know from other facts; and accordingly in the yew we have the other extreme, in which the calyx, petal, and disk are all separate and distinct.

The yew also shows us that although in cone-bearing Conifers

the flower is monopetalous, theoretically it is dipetalous, the half of it only being present in them; for when, as in the yew, we have the whole present, we then find a petal or scale on each side, opposed to each other at the base of the disk, which only begins to grow after the petals or scales have attained their full dimensions.

It may be that I am wrong in referring the claret-coloured crust of petaloid texture which I observed between the scales in *Wellingtonia* to the bract, and that it has not this relation at all, and also that cypresses have truly no bract. Should that be so, it would furnish a good distinctive character for separating the cypresses from the pines.

I owe some apology to the reader for desiring to give additional explanation on an opinion expressed so recently; but in all new lines of thought the mind is at first apt to veer backwards and forwards as new objections or doubts suggest themselves; and although it may not be better for the scientific reputation of the thinker, it is certainly better for the progress of truth, that these vibrations should be candidly acknowledged, so that the real weight of the objections may be estimated by fresh and impartial minds.

XLI.—*Notulæ Lichenologicæ*. No. X.

By the Rev. W. A. LEIGHTON, B.A., F.L.S.

CLADONIÆ ACHARIANÆ.

THE Rev. P'Abbé Eugène Coëmans, of Gand, Belgium, has recently published, in the 'Bullétins de l'Académie royale de Belgique,' sér. 2. t. xix., the results of an investigation of the herbarium of Acharius, so far as regards the *Cladoniæ*. The herbarium of Acharius is preserved in the Museum of the University of Helsingfors; and its arrangement is precisely that of the latest work of this author, the 'Synopsis methodica Lichenum,' 1814. The collection comprises 43 genera and about 980 species, besides innumerable varieties. The localities whence the specimens have been gathered are generally noted; but the specimens themselves are often small, and with respect to those communicated by others we have no other clue to whence they came than the peculiar handwritings of the correspondents of the illustrious lichenographer. The *Cladoniæ* constitute about a fifteenth part of the collection, and, although not the most beautiful portion, is nevertheless exceedingly precious, and contains a great number of the types of Flörke, Schaerer, and Léon Dufour.

The object proposed in this revision of the Acharian herba-